Low-concentration salting of cod loins: The effect on biochemical properties and predicted water retention during heating

Low levels of salt are frequently used to increase flavor and water retention in cod. This alters the biochemical properties of cod during heating. In this paper, properties needed to mathematically model moisture transfer during cooking – water holding capacity and storage modulus – were determined for cod containing 0.06, 1 and 3 g/100 g NaCl. Protein denaturation and microstructure was also investigated to increase the understanding of quality effects of salt during cooking. A model was established to investigate the effect of the measured storage modulus and water holding capacity on the predicted moisture retention during heating. Salting lead to a higher water holding capacity, less hardening of the muscle tissue during heating, diffused protein denaturation peaks and caused swelling of the muscle fibers. By interchanging the acquired variables in the model of coupled heat and moisture transfer, we found a higher predicted water retention during cooking of brined cod compared to unsalted cod. This knowledge may be utilized in creating modeling tools for optimization of cooking processes, which may support chefs and ready-to-eat meal producers in reducing weight loss and improving the texture and juiciness of their products.